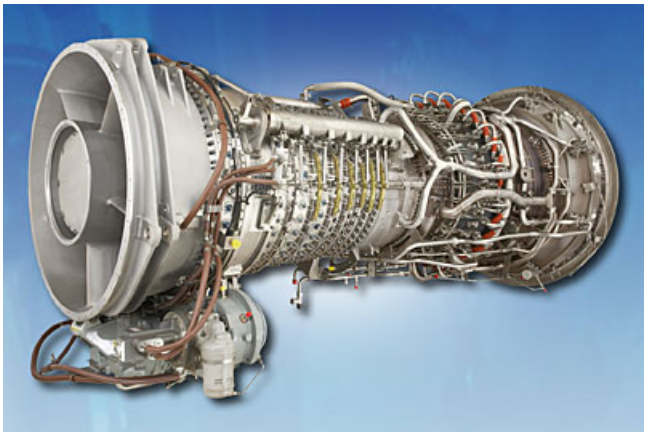


INL is working with DOE Industrial Programs and General Electric to analyze GE's process for producing electricity from exhaust heat produced by industrial engines, such as the GE gas turbine shown here. (photo credit: General Electric)

## GE, INL researchers collaborate on waste heat efficiency research

by Keith Arterburn, *INL Communications & Public Affairs*

"Waste not, want not."

This wise proverb is even more appropriate today in a global society demanding more energy for more uses. Squeezing more efficiency out of every energy unit is paramount.

***Left to right are GE's Todd Wetzel, Mike VanDerwerken and Helge Klockow; INL's Donna Guillen; GE's Matthew Lehar; INL's Dan Ginosar, Manohar Sohal and Rick Wood; and DOE's Debo Aichbhaunmik.***

Recently, researchers at Idaho National Laboratory met with engineers from GE Global Research (NYSE:GE) to kick off a two-year, public-private partnership project designed to capture energy from waste heat.

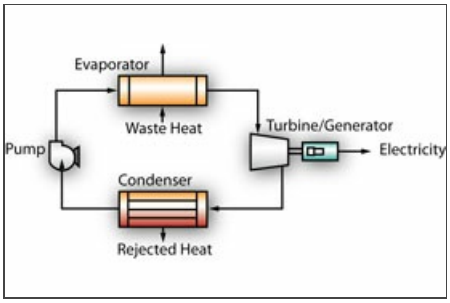
INL is leading this $2 million project that is part of the Department of Energy's Industrial Technologies Program aimed at increasing energy efficiency of U.S. industries for a cleaner, more energy-efficient America.

The INL partnership will examine GE's proprietary technology that captures energy from industrial engines that often are only 35 percent efficient, rejecting 65 percent of the available energy as waste heat. Capturing more of that energy makes sense in an era of rising energy costs, increasing demand and concerns about greenhouse gas emissions.

"This new technology could yield a 20- to 40-percent increase in energy efficiency," said Donna Guillen, INL research engineer and project leader. "The process can produce additional electricity without using additional fuel, avoiding the release of millions of tons of greenhouse gas emissions and reducing U.S. reliance on foreign oil."

The INL-GE project will optimize the conversion of low-temperature waste heat (below 500 degrees Celsius) from gas turbine or reciprocating engine exhaust to produce electricity. The process is based on a thermodynamic process called the Organic Rankine Cycle, which uses an organic working fluid.

"GE has developed a new technology that transforms the Rankine cycle by eliminating the intermediate hot oil stage," said Todd Wetzel of GE's Niskayuna, N.Y., division. "Our new evaporator permits direct transfer of this waste heat, which increases overall efficiency at a far more affordable price than before."




***Concept schematic of direct evaporator for Organic Rankine Cycle.***

Until now, ORCs have been marginally economic because of the cost of the equipment and fluids. GE's invention is expected to significantly lower the capital cost of the system and improve efficiency, which are important in responding to rising energy prices and increased global demand.

"This concept is transformational because it places the evaporator directly in the hot exhaust stream, something that no other commercial company has dared to do before," Guillen said. "Our INL team will be conducting analyses on the flammability, chemical decomposition and two-phase heat transfer aspects of GE's design."

The INL team, led by Guillen, includes respected researchers with a solid record of noteworthy accomplishments -- Dan Ginosar, Rick Wood and Manohar Sohal. The GE team is led by Wetzel and includes engineers Mike VanDerwerken, Helge Klockow and Matthew Lehar.

"GE will use the INL analysis to guide the design and testing of the direct evaporator prototypes at its research centers in New York and Germany," Wetzel said.

Visit GE Global Research.
Visit the Department of Energy's Industrial Technologies Program.
Read the DOE Fact Sheet about ORC.

Feature Archive